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U. S. DEPARTMENT OF AGRICULTURE,

STATES RELATIONS SERVICE.

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BEEF PRODUCTION.

SUGGESTIONS FOR TEACHERS IN SECONDARY SCHOOLS.¹By H. P. BARROWS, *Specialist in Agricultural Education.*

INTRODUCTION.

The present situation with regard to our national food supply demands that more careful consideration be given the production of meat on the farm. It is especially necessary for the farmer to consider carefully the essentials of beef production if he is to make any money in feeding high-priced forage and grain to beef animals. The present food situation is, in fact, calling for better methods in all phases of farming, and it is necessary for the teacher of agriculture to do his part in aiding in the present crisis and in preparing for the new era in agriculture which is dawning upon us. It is more than likely that the demand for a high degree of efficiency in beef production such as is needed at present will continue, as the passing of the range will cause beef to be a relatively high-priced product. The needs of to-morrow as well as the requirements of to-day must be kept in mind in training the farmers of the future.

ADAPTING THE COURSE TO COMMUNITY NEEDS.

Beef production should be but an incidental phase of a general course in animal husbandry in all sections of the United States where it does not form a definite important part of the farming of the section in which the school is serving. In other districts a good part of the course may very well be based upon the care and management of beef cattle, as this work forms an important phase of local agriculture. In such sections some of the larger secondary schools are very properly giving a special course in beef production of a practical nature.

The nature as well as the extent of the treatment of the subject should depend upon local demands. In many sections of the East the problems are centered entirely around the purchase and fattening of feeding stock; most ranchers in the far West produce the feeders, with no attempt at fattening, and in some parts of the Middle West the cattle are raised and finished for market on the same farm. As much time might be wasted in considering methods of finishing in some of the mountain districts of the West as there would be in considering range management in the East. Each district will have its peculiar local problems as well as problems peculiar to the wider section. In many districts of the South the tick question is still the big problem, while in others it is a matter of getting animals of better beef breeding. In all parts of the South and West there are sections ideal for the production of cheap beef if there were better marketing facilities.

A LOCAL SURVEY.

Purpose.—If the course is to be adapted to meet local conditions, the instructor and his class should make a systematic effort to learn what the community is doing by way of beef production. The purposes of such a survey, stated more specifically, are as follows:

- (1) It affords the teacher an opportunity to learn the agriculture of the community.
- (2) It gives the students opportunity to get concrete experience and information at first hand.

¹ Prepared under the direction of F. E. Heald, Specialist in Agricultural Education, in charge.

- (3) Material is afforded for classroom instruction and suggestions received for conducting home projects.
- (4) Material is located and opportunity suggested for class practicums.
- (5) A way is opened for local extension service.
- (6) Data may be collected which will be useful to State and Federal agricultural workers.

Method.—Teachers employed throughout the year often spend part of their summer time in securing agricultural data in their districts in connection with the supervision of home projects. The work will mean more to the students, however, if they participate in gathering the information. Some of the older and more discreet students can render valuable assistance in visiting farmers of the district. Each student should secure the information from his home farm and from nearby neighbors, if possible. After all reports are in the data should be tabulated for further use. It will aid greatly in visualizing the results to show them on a map of the district. The survey of beef production may be but a part of a general live-stock survey or a farm-management survey of the district.

Survey outline.—The following questions are suggestive of a form which may be adapted to meet various local needs:

General character and size of farm.—Acres in permanent pasture Acres in crops Undeveloped land Total acres Value per acre Number of cattle horses sheep swine Is the fertility and general value of the land increasing?

Equipment.—Shelter, nature and capacity of barns and sheds What natural shelter is provided? Nature and capacity of silo Provisions for water in winter Racks, self-feeders, and other feeding equipment Dipping vats and other equipment for prevention and control of disease

Systems of management.—Are cattle raised for feeding? Are they sold as feeders or finished for market? Are feeders purchased? Number per year Age Type Where bought Winter or summer feeding Are cattle raised for breeding purposes? Number of breeding animals Breed Is baby beef produced? Method of raising calves Method of managing bull How many cattle can one man care for on this farm? General remarks as to system of management

Feeds and feeding.—Amount and nature of pasture Crops used for pasture Acreage required per animal When turned on to pasture When taken off Supplementary feeding Provisions for water and shade Roughage fed in winter: Amount per animal and kind of hay, stover, silage, beet pulp, etc. Method of feeding roughage Concentrates: Amount per animal of corn and other grains Fed whole or ground Commercial concentrates, such as linseed-oil meal, cottonseed meal, brewer's grain How are concentrates fed? Do hogs follow the cattle? How many to each? What are the most important feeding problems?

Prevention and control of disease.—Are animals inspected carefully when brought to the farm? Methods of dipping Rotation of pastures Vaccination What are the chief problems in disease prevention and control?

Results.—What gains are made by animals of different weights in the feed lot? What gains are made on pasture? What is the amount received per cwt. for crops of the farm fed to live stock? How does this price compare with market price of products? What is the labor cost per head? What is the cost of marketing per head? Total cost per cwt. Amount received per cwt. Weight and condition of animals sold How and where marketed? Amount of shrinkage per head Grading of cattle by purchaser What are the leading marketing problems?

CLASSROOM INSTRUCTION.

Use of reference material.—Although the experience of the community and of the students upon their home farms and in connection with their home projects should be made the basis for a good part of the classroom instruction, good use may be made of a text and the abundance of reference material available in the shape of books, bulletins, and farm papers. The books available range from a meager treatment of the subject in a general text in animal husbandry to special treatises on feeding, breeding, types, and breeds, and even upon the particular breeds; hence there should be no difficulty in securing a text to meet the needs of the course given. Any text will need supplementing to fit a course adjusted to meet needs of students and community. In the wide range of the phases of beef production covered in the bulletins

of this department will be found much valuable supplementary material; in fact, these publications may be used in many courses in lieu of a text. In adapting the work to meet local needs, the publications of the State agricultural college should be used. There are several live-stock journals of national scope which may be used effectively. If files are not kept of the papers, the articles suitable for reference use should be clipped and filed according to subject. If such a method is used, one will turn to a file labeled "Beef Production" or "Beef Cattle," and probably will find there timely articles pertaining to the subject. Live-stock journals will be useful also as sources of illustrative material and as a means of keeping up with market conditions.

Use of illustrative material.—(1) *Field trips.*—Wherever there is time and opportunity the most profitable instruction may be given outside the classroom. Field trips should be taken to surrounding farms for the purpose of studying progressive, modern methods of management, for the study of the best types and breeds of beef animals, and for a critical examination of equipment. At times it may be worth while to give some consideration to inferior methods, stock, and equipment for purposes of contrast. Live-stock sales, exhibits, and fairs as a rule afford unusual opportunities to see the best in types and breeds and afford opportunity for observation and practice in judging. In connection with a study of beef and the beef type, it will be worth while to visit local butchers or stockyards and abattoirs, if these are available. Every field trip should have a definite purpose and close supervision. Students should be required to report their observations either orally or in writing.

(2) *Classroom material.*—It should not be difficult to secure samples of commercial feeding stuffs and of packing-house products for classroom use. Student should prepare samples of local feeding stuffs also, to be a part of the school museum. An exhibit should show sample rations for various purposes and stages in the feeding process. A set of lantern slides in which the good and bad in types and breeds of beef cattle and in methods of management are shown will be very helpful if the school has a stereopticon. The division of agricultural instruction in schools of the States Relations Service will be glad to put teachers in touch with sources of such lantern slides. In the absence of a stereopticon good use may be made of pictures and charts. All of the better live-stock papers have excellent illustrations which may be used in establishing ideals in animals, equipment, and methods. Catalogues of dealers and breeders have value for the same purpose. Outlines showing beef conformation, points in judging, cuts of beef, plans of buildings, and other equipment may be made in permanent form on cloth or paper or sketched upon the blackboard. Any wise use of such material will have value in arousing interest and visualizing the lesson.

Sequence of subject matter.—Inasmuch as much of the work with beef cattle runs throughout the year, and seasonal adaptation depends so much on locality, the suggestions which follow regarding subjects and topics are based upon a logical, rather than a chronological or seasonal sequence.

General principles of feeding.—It is assumed that a course in animal husbandry will include a consideration of the general principles which underlie the feeding of all farm animals. The extent and nature of the lessons given must depend upon the time available and the previous preparation which the students have had. Students who have had a course in human physiology in the high school should have little difficulty in understanding how to apply to the feeding of animals the principles of nutrition which they have learned. On the other hand, the teacher of agriculture should bear in mind that it will be well worth while to work out with the students who have not had physiology the fundamentals of nutrition, not only because of their value in a proper understanding of animal feeding, but also because of their application to the care of their own bodies. If students have not had a course in chemistry, it will be necessary to take some time to make clear, in the first lessons, the elementary chemical knowledge involved. Care should be taken, however, not to make these lessons too technical nor too abstract. The principles of nutrition should be connected as closely as possible with the practice of feeding and approached as far as possible in an inductive way through concrete experience which the students have had. The following outline should prove suggestive of general lessons which may be applied later to specific problems in feeding other kinds of farm animals as well as beef cattle:

I. Composition of plants and animals.

1. Composition of matter. (a) Elements; (b) compounds.
2. Relation of plants to the soil.
3. General composition of plants.
4. Relation of animals to plants.
5. General composition of animals.
6. The cycle of organic matter.

II. Nutrients.

1. Carbohydrates. (a) Nature; (b) sources.
2. Proteids. (a) Nature; (b) sources.
3. Fats. (a) Nature; (b) sources.
4. Relative value of nutrients.
5. Water and mineral matter.

III. Digestion, assimilation, and excretion.

1. Nature of each process.
2. Organs.
3. Importance of normal function.

IV. Function of nutrients.

1. Carbohydrates.
2. Proteids.
3. Fats.
4. Water and mineral.

V. Feeding standards.

1. The nutritive ratio.
2. Comparison of standards.
3. Relative needs of animals of different classes.
4. Practice in determining ratio.

VI. Feeding stuffs.

1. Coarse feeds. (a) Place of roughages in the ration; (b) animal forage crops; (c) hay and straw; (d) pastures; (e) soiling crops; (f) silos and silage.
2. Concentrates. (a) Place in the ration; (b) cereals; (c) commercial feeding stuffs.

VII. Purposes in feeding.

1. Maintenance.
2. Growth and development.
3. Feeding for work.
4. Wool production.
5. Milk production.
6. Meat production.

The beef type.—A study of the beef type furnishes an excellent approach to a study of beef production. It should be the aim of such a study to show the student what may be accomplished by careful breeding and feeding and to establish in his mind an ideal toward which to work. At the outset the students should understand clearly the function of meat-producing animals; that they are essentially living machines, or factories, which convert raw material, mostly in the nature of foodstuffs in a form not available to man, into a more concentrated, palatable product. The value of the animal will depend upon the nature and quality of the product and the efficiency with which it is produced.

In establishing the ideal beef type in the minds of the students, nothing is superior to living animals which approach perfection. Advantage should be taken of the best beef cattle in the neighborhood of the school and those exhibited at local fairs, as an aid to students in securing proper conceptions of good beef form. If the students have been considering the dairy type, it will be helpful to contrast the form and function of the two types. Any study of the beef type in the classroom, to be effective, should be linked closely with the use of the score card and practical work in judging.

Market classes and grades.—In sections where beef production is chiefly a problem of buying feeders and fattening them for market, emphasis should be given a consideration of market classes and grades. It will be logical to consider this subject in such sections in connection with a study of the beef type. The distinction between classes and grades should be made clear at the outset. The names of the classes indicate the use to which the cattle are to be put, hence we have beef cattle, butcher stock, cutters and canners, stockers and feeders, and veal calves. The grades have reference to quality, condition, and conformation, as they influence market value. The grades—prime, choice, good, medium, common and inferior—may apply more or less to all of the classes. A knowledge of market classes and grades is of special importance in connection with marketing if the students are to follow the market fluctuations intelligently. The class which has an opportunity to visit one of the larger markets or packing houses will be especially favored in getting acquainted with the market methods of classification.

Modern beef production.—If time permits it will prove interesting and helpful to take a general survey of the beef-cattle industry in the United States as an intro-

ductory lesson. The story of the cattle industry is one of the most interesting chapters in our national history. The western movement of the range cattle industry and the readjustment of the industry to meet modern conditions form an important phase of our agricultural development. Emphasis should be placed upon the present-day status of beef production, especially in the particular section and locality which the school represents. If beef production affords opportunities for projects for the students in the community, this is a good point at which to set them forth with a discussion of the phases of the industry offering the greatest possibilities.

Care and management.—A discussion of the main problems of beef production under this heading may very well follow the outline given in connection with the suggestions on the home project. Although the majority of the students may not have a beef production project, it will add interest and give a good basis for a logical consideration of the subject if it is assumed that each one is actually to meet the practical problems involved. If the interests of the students and the community are centered around baby beef production, Farmers' Bulletin 811, The Production of Baby Beef, may very well form a basis for the classroom discussion. In adapting the subject to the various sections of the country such a publication should be supplemented with State publications and department bulletins intended for limited areas. For example, in the Southern States, Farmers' Bulletins 580, Beef Production in the South, and the department bulletins concerning beef production in Alabama should be used. In the Middle West, Farmers' Bulletin 588, Economical Cattle Feeding in the Corn Belt, should prove very helpful.

Improvement of beef cattle.—In considering the principles of breeding as applied to beef cattle, it is assumed that in the course in animal husbandry some time will be given to a general discussion of the principles of breeding before any attempt is made to apply them to a particular group of animals. Such a general discussion should be adapted to the capacities of secondary students, hence would involve only the most important principles as suggested in the following outline:

- I. Variation in animals.
 - 1. Law of variation.
 - 2. Sports and mutations.
 - 3. Selection. (a) Natural; (b) by man.
- II. Heredity.
 - 1. Comparison of law with variation.
 - 2. Mendel's law.
 - 3. Cross breeding *v.* line breeding.
- III. Prepotency.
 - 1. Value in breeding. Prepotent individual.
 - 2. A study of pedigrees.
 - 3. Registration of animals.
- IV. Practical problems in breeding.
 - 1. Increasing variation.
 - 2. Selection according to ideals.
 - 3. Testing hereditary power.
- V. Improvement of common stock.
 - 1. Weeding out unprofitable individuals.
 - 2. Use of pure-bred sires.
 - 3. Cooperative breeding.

In applying such general principles to the improvement of beef cattle special consideration should be given the selection of animals for breeding purposes. This subject will connect closely with a study of the beef type, a study of breeds, and practical work in judging. If time permits, interest may be developed in a study of noted individuals and families of beef cattle and a consideration of pedigrees. The care and management of the bull should be considered at this time, as well as the care and management of the cow at calving time.

Breeds of beef cattle.—In sections where a study of market classes and grades is not of great relative importance there may be advantage in considering breeds of beef cattle in connection with a study of the beef type. This subject, however, follows logically in any case a discussion of the breeding of beef cattle. Farmers' Bulletin 612, Breeds of Beef Cattle, will serve well as a basis for a discussion of breeds. Emphasis should be placed upon the breed or breeds most important and best adapted to the section which the school serves. A good deal of time may be wasted in a detailed consideration of breeds with which the students will have little to do.

SCHOOL AND HOME PRACTICUMS.

*Judging beef cattle.*¹—(a) Comparison of beef and dairy type.—Practical judging of beef cattle may very well begin with a lesson in the field, wherein an animal of good beef form is compared with an animal which lacks the beef type. If the class has made a study of the dairy type, the students may then make a comparison of an animal approaching the ideal beef type with a dairy cow of good form, the object of such a lesson being to show the relation of form to function and to aid in developing in the minds of the students an ideal beef type.

(b) Use of the score card for fat cattle.—The use of a score card on animals of good type should also aid the students in establishing ideals. The score card is a classification of the points of the animal, giving to each a weight or percentage intended to indicate its relative importance to the whole. It is used chiefly for the purposes of aiding the students to examine the animal in a systematic manner, that they may overlook no details and that they may develop judgment with regard to the relative importance of points. A distinction should be made between the score card which represents the general beef type and score cards for the various beef breeds which represent the distinctive breed types. Use of the score card for fat cattle of the beef type should accompany a study of the beef type. Score cards for this purpose are usually furnished by the State agricultural college. Use of the breed score cards may accompany a study of breeds. Cards for this purpose are usually furnished by the breed association.

Comparative judging.—The use of the score card should be considered but preliminary to real judging, i. e., by comparison and placing according to merit. In trying out and developing the judgment of students in comparative judging, it will be better to select animals at first which have marked difference in beef form. As skill is developed, animals more nearly equal may be chosen. As a preliminary also to placing according to general merit, it may be well to have the students place them according to one general feature, such as conformation, quality, or condition. The students should also have practice in estimating weights. Such practice will be helpful in connection with giving reasons for their placings according to general merit.

Judging market cattle.—The secondary school may not aspire to train judges for the show ring, but the practical work in judging should develop ability in determining the value of such cattle as are bought and sold by the farmer. The students should keep in touch with market conditions, and, as a final test of their ability to judge fat cattle, place a market value on finished cattle. If time permits, they should also be given practice in selecting suitable cattle for feeding and place a money value upon them. The judgment of the students should be checked up with the judgment of the owners and actual sales, if possible. In connection with a study of breeding and a consideration of breeds, opportunity should be given in selecting animals with a definite aim in breeding in mind. The idea is to apply the student's training in stock judging to conditions such as the student will meet as a farmer. If any number of the students are going to start their home projects with calves, special attention should be given to the selecting of calves.

There is an advantage in judging animals intended for the local market or for butchering on the farm, as there may be an opportunity to compare the judgment of the students on the animal before slaughter with the carcass after killing. A study of the cuts of beef in connection with judging should at least aid the students in keeping the fact in mind that the butcher and consumer are the ultimate judges, and that their needs must be kept in mind.

Fitting for the show ring.—Although it is beyond the scope of the secondary school to give much attention to show-ring considerations, either in the training of judges or in the fitting of cattle, local shows and fairs should be encouraged. Wherever any number of students have beef cattle to exhibit at a school or local fair, some time may be spent very profitably in aiding the students to fit their animals properly. It may be advisable to assign such work as individual home practicums instead of taking the time of the class as a whole.

Making equipment.—A considerable amount of equipment is needed in connection with beef production, and this may be made by the students as a part of their work in farm mechanics. Such exercises as the making of feed racks and watering troughs may be made cooperative between classes in animal husbandry and farm mechanics or assigned to students as individual home work.

Making and using a dipping vat.—In tick-infested sections of the South, a number of the agricultural schools have constructed dipping vats for the use of the community.

¹ See Department Bulletin 434, Judging the Dairy Cow as a Subject of Instruction in Secondary Schools. Many of the suggestions with regard to teaching given in this bulletin will apply to judging beef cattle.

Such a project not only gives good training in concrete construction and practice in dipping, but also an excellent beginning toward broad community service. The drafting of plans for barns and sheds should accompany practical construction.

Simple operations.—A teacher with a little veterinary training may go too far in attempting to make his students independent of the professional services of a veterinarian. There are simple operations and practices in the prevention of disease, however, in which the secondary school should aid its students. Every student may not become skilled in such operations as castrating and dehorning, but if the teacher is properly prepared to direct such work, every student should have an opportunity to develop skill in such operations. The same idea will hold with regard to vaccination in sections where blackleg prevails. The teacher should give demonstrations for the benefit of the class. It will be preferable not to require all the students to do the work, but to give special help to individual students who wish to practice further at home.

Common farm practice.—There are certain phases of farm practice which every farm boy should know and which the majority of students living on farms will know as a part of their general training. If any student taking animal husbandry does not know how properly to teach a calf to drink, or to administer salts, or such medicine, he should be required to secure home practice and demonstrate his proficiency as a part of the course. Each student should also know how to milk a cow in an efficient, sanitary manner.

Preparing rations.—While weighing out and compounding portions of rations may form a suitable laboratory exercise, and the working out of balanced rations will present excellent problems in connection with a classroom discussion of feeding, the preparation of actual rations for cattle in the feed lot will afford the best kind of practice. Whether students are having a home project in beef production or not, if they have anything to do with the feeding of beef animals, they should be encouraged to keep a record of the feeding and its results. The keeping of such a record may be made a minor project.

Records and accounts.—Each student having a beef-production project, or a project in keeping a record of beef production, should have a record book in which daily entry is made of the feeding, management, and results obtained.¹

The following summary and financial statement will be suggestive of records to be kept:

SUMMARY AND FINANCIAL STATEMENT OF A BEEF-PRODUCTION PROJECT.

From 19.., to 19..

Student School

Address Number of animals

Breed Purpose of project

RECORD OF FEED AND LABOR.

Date.	Pounds of grain fed.	Pounds of rough- age fed.	Cost of feed.						Labor.	
			Grain.		Roughage.		Total.		Hours.	Value.
			Dollars.	Cents.	Dollars.	Cents.	Dollars.	Cents.		
Jan.										
Feb.										
Mar.										
Apr.										
May.										
June.										
July.										
Aug.										
Sept.										
Oct.										
Nov.										
Dec.										
Total.										

¹ Record forms such as used by members of the baby beef clubs will be suitable for such projects. These record books may be obtained from the Bureau of Animal Industry of this department.

FINANCIAL STATEMENT.

VALUE OF INCREASE.

From increase in weight.....	\$.....
From increase in selling price.....	.....
From increase by births.....	.....
From manures.....	.....
From hides, etc.....	.....
 Total value of increase.....	\$.....

EXPENSES.

Concentrates fed.....	\$.....
Roughages fed.....	.....
Value of pasture.....	.....
Rental of buildings.....	.....
Care of live stock.....	.....
Other expenses.....	.....
 Total expenses.....	.....
Net profit from project.....	.....
Net profit per head.....	.....

A home project.—In sections adapted to beef cattle, a special effort should be made at this time to get students of agriculture who are living at home to take hold of some phase of beef production as a home project. Taking hold of such a project at this time will be rendering a patriotic service, especially if any time or feed is used that might otherwise be wasted. The primary motive that the teacher should have, however, in getting the student to take hold of such a project, is not so much to increase production as it is to secure training for the boy. A boy who raises a number of calves successfully and turns them out as prime beef can not help being better for the effort he has put forth. Although the aim of an initial project may be to feed and fatten one or more animals for market, the teacher should not feel satisfied unless some of the students are inspired to continue with the idea of developing a breeding herd of pure-bred animals.

The home project in beef production may very well be in cooperation with the work of the baby beef clubs, where these are established. In many cases, it will be desirable to combine a pork-production project with the project in beef production. In sections where whole corn is fed, it will be especially desirable to have pigs follow the beef cattle in the feed lot. In a number of sections bankers and other public-spirited men have made it possible for the boys to get both calves and pigs of good breeding.

The following outline intended to cover baby-beef production may be modified to fit local conditions, and adapted to other phases of beef production such as fattening older stock:

BEEF PROJECT STUDY OUTLINE.

BABY-BEEF PRODUCTION.

I. What are the present prospects for profitable beef production in this section?

1. Is this section especially suited to beef cattle?
2. What results are being obtained by progressive farmers in feeding beef cattle?
3. Is there a local market for a high-class product?
4. Are there facilities for shipping to good markets?
5. Can I have the use of good pastures and obtain an abundance of other cheap forage?
6. How do the prices paid for beef compare with the prices of hay and grain?
7. May I obtain some good stock at a reasonable price?
8. Are there any diseases and pests which may prove serious and beyond my control?
9. How will the care of cattle fit in with my other work and with the general management of our farm?
10. Do I like cattle and enjoy working with them?

II. How shall I start with my project?

1. What shall be my aim in beef production?
2. Why is there a tendency at the present time toward the early marketing of beef animals?
3. What is meant by baby-beef production?
4. What are the advantages of baby-beef production?
5. What are the general disadvantages of producing baby beef?
6. What particular factors are there for and against producing baby beef under the conditions which I shall have to meet?
7. Shall I start with cows or with calves?
8. How many calves should I feed to make profitable use of my time?
9. Will it be possible for me to take over all or a part of the management of the beef cattle on the home farm?
10. Will it be most profitable to start with cows and raise their calves or to buy calves for feeding?
11. Where can I get suitable stock for a beginning?

III. What type and breed shall I select?

1. Why can I not expect to make good baby beef from the calves of cows of pronounced dairy type?
2. Under what conditions will calves of dual-purpose cows make good baby beef?
3. What are the chief characteristics of cows from which suitable calves may be expected?
4. Why is the breeding and the individual character of the bull of more importance than that of the cow?
5. What are the chief qualities I should look for in a bull intended to sire beef calves?
6. How do the bulls available for service in this community measure up to a standard of perfection for beef animals?
7. What special qualities are to be sought in animals intended for baby beef?
8. Why must great attention be given the breeding of calves which I might select for baby-beef production?
9. What qualities can be determined and should be carefully noted in the calf itself?
10. Which breed is best adapted to this section?
11. What are the relative merits of the leading beef breeds in relation to the production of baby beef?
12. Is there not a possibility of working toward building up a breeding herd of pure-bred cattle?
13. Can pure-bred stock be obtained in the community at prices which will permit of profitable feeding for market?
14. Where can I obtain stock which will suit my purpose best at a reasonable price?

IV. What equipment will I need for beef production?

1. What improvements or modifications should be made with regard to sheds and yards to make them suitable for the care and management of cattle?
2. Can I plan barns and sheds suitable for beef cattle in this section?
3. What kind of feeding racks will prove most efficient and economical with regard to both labor and feed?
4. What facilities must be provided for watering?
5. Can I make suitable feed racks and watering troughs?
6. What provisions must be made for prevention and control of pests and disease?
7. Will I need to build a dipping vat or may I have the use of a vat in the community in case of tick infection?

V. Do I understand the feeding and management of young calves?

1. What are the advantages of the fall calving plan?
2. What are the disadvantages of this plan?
3. Will the fall or spring plan serve best under local conditions in this section?
4. What are the four systems of management of cows and calves which are practiced most extensively in the United States?
5. What are the advantages and disadvantages of each system?
6. Which system is best adapted to our local conditions?
7. At what time should calves be dehorned, castrated, and vaccinated?

8. What is the best method for dehorning?
9. How are the males most successfully castrated?
10. Can I perform these operations skillfully?
11. Is blackleg prevalent in this section?
12. Can I vaccinate calves successfully?
13. Why may it be necessary to repeat vaccination?
14. Why will not skim milk take the place of whole milk sucked fresh from the dam in starting beef calves?
15. Why should the milk be supplemented with grain before the calf is weaned?
16. What kind of grain is best suited to feeding before the calf is weaned?
17. What amount of grain should be given at this time, and in what form should it be fed?
18. Why is weaning time the critical period with calves intended for baby beef?
19. What provision may be made to increase the grain for the calves while still running with the cows?
20. How and why should the calves be weaned gradually?

VI. How can I develop the weaned calves and finish them best for market?

1. Why will the plan of feeding and management depend upon the time the calf is born?
2. What influence will the age of marketing have upon the plan of feeding?
3. Can I work out a definite plan of feeding and management for the calves I shall feed showing the kind of feed and management for each month of the year?
4. What feeds will supplement pasture feeding best in this section?
5. What will be a suitable ration for a yearling calf in the feed lot in this section at the present time?
6. Why are alfalfa and clover hay excellent feeds for young stock?
7. What are the particular merits of silage as a roughage?
8. Why are corn and cottonseed meal or linseed meal of great value in finishing for market?
9. Are there any concentrates which will take the place of these feeds in this section?
10. Why does oat straw have special value?
11. How is the fattening ration increased?
12. Why is better success obtained in the dry lot than by attempting to finish in pasture?
13. Why must care be exercised in attempting to change from dry lot to pasture?
14. Why is there an advantage in having pigs to follow the calves in the feed lot?
15. How many pigs shall I need to take care of the waste of the calves I shall feed?

VII. Do I understand the management of a breeding herd?

1. Why is a herd of 30 to 35 cows a desirable unit for baby-beef production?
2. What advantage has a breeder who can keep twice that number of cows?
3. What are the relative advantages of allowing a bull to run with the herd, and of keeping him apart from the cows?
4. What is a suitable ration for a breeding bull?
5. Why should abundant exercise be provided for the bull?
6. What kind of exercise is best suited to his needs?
7. When should the cows be bred for producing baby-beef calves under the system of management best suited to this section?
8. At what age should beef heifers bring the first calf?
9. Why should the greater part of the ration of breeding cows consist of roughage?
10. What attention should be given cows on good pasture?
11. What will constitute a good winter ration in this section?
12. Why should the system of feeding and management vary with the seasons in which it is intended the cows shall calf?
13. Do I understand how to handle cows at breeding time?
14. Do I understand how to handle cows at calving time?

VIII. How may beef cattle be marketed to best advantage?

1. Are there good local markets for beef cattle?
2. Do I understand the requirements of the local market?
3. What facilities are afforded for shipping to distant markets?
4. Do I understand the classification and requirements of the live-stock market?
5. Is there a possibility of a cooperative live-stock association in this section?
6. Do I know how to kill and dress beef for home use or for local trade?

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